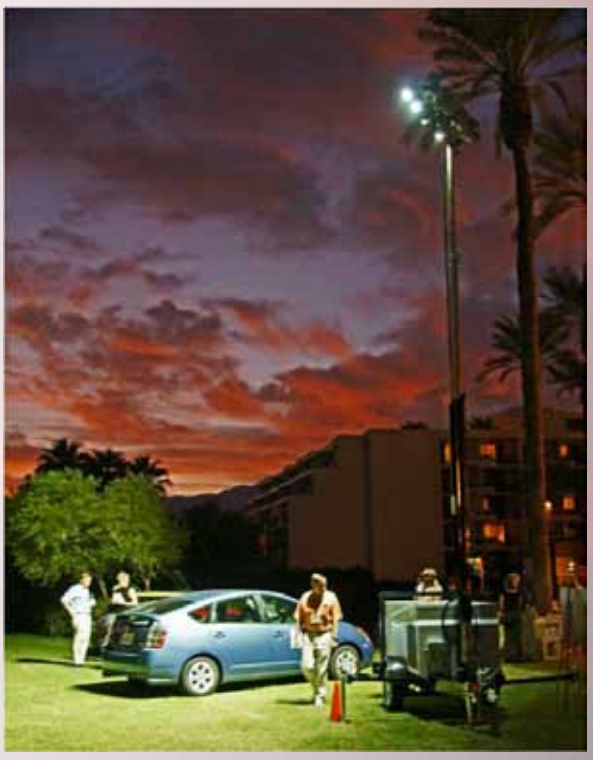
Sandia & Boeing, Caltrans, and Others
Fuel Cell-Powered Mobile Lighting Applications

Background
Highway construction workers, airport maintenance personnel, and film crews use small, portable lighting systems known as "mobile lighting." Traditionally, mobile lighting units are powered by diesel fuel generators that produce CO_2, NO_x (nitrogen oxides produced during combustion), and soot, putting them at odds with the environment. Sandia National Laboratories, with help from Boeing, the California Department of Transportation (Caltrans), and others, is leading an effort to develop commercially viable, environmentally friendly, fuel cell-powered mobile lighting systems.

Innovative Edge
Sandia is currently working on two separate lighting unit designs. The alpha unit was unveiled in October 2009 at the annual meeting of the American Association of State Highway and Transportation Officials (AASHTO). The alpha system consists of advanced power-saving Light Emitting Plasma™ technology (contributed by Luxim, Lumenworks, and Stray Light), two high-pressure hydrogen tanks (purchased by Sandia), a trailer with lighting mast (provided by Multiquip), and a fuel cell (provided and installed by Altergy Systems). In addition to creating pollutants, conventional systems powered by diesel fuel generators are extremely noisy. Altergy's fuel cell systems, which run on pure hydrogen, are very quiet and produce zero emissions. Boeing funded Sandia to develop a beta design, which is more sophisticated and technically ambitious than its alpha predecessor. The beta unit uses metal hydride storage tanks, designed by Ovonic Hydrogen Systems, which allow the units to run around 60 hours longer than the alpha design. Additionally, Sandians solved thermal management issues surrounding metal hydride storage. The low-pressure metal hydride design mitigates safety concerns about having high gas pressure on the unit.

Commercialization & Industry Impact
The end goal of the project is to make fuel cell technology readily available for commercial use, particularly in general construction and aviation maintenance applications. So far, the project has attracted the interest of the San Francisco International Airport, which would like to test the system for use in nighttime runway repair work. Caltrans also would like to deploy the unit in their road maintenance work in Sylmar, CA.



The alpha fuel cell light on display at the AASHTO show.